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Raman spectroscopy of suspended mono and bilayer graphene ALEXANDER KITT, Boston University, BENJAMIN FELDMAN, Harvard University, SEBASTIAN REMI, BU, JENS MARTIN, Harvard University, ANNA SWAN, BU, AMIR YACOBY, Harvard University, BENNETT GOLDBERG, BU — Suspended mono and bilayer graphene flakes have been shown to have higher mobility and lower disorder than their supported counterparts[1]. The geometry which decouples the flake from the substrate also causes an as yet uncharacterized backgate specific strain due to an electrostatic attraction between the graphene and the back gated substrate. We study this strain using spatially resolved Raman spectroscopy with a diffraction limited spot size. Upon application of uni-axial strain the unit cell is stretched reducing the symmetry of the system and breaking the double degeneracy of the G band causing a split in the peak. Additionally the Raman modes show a linear softening as a function of strain in the case of supported graphene. Suspended flakes provide an ideal system to study back gate tunable strain while avoiding complications due to substrates including the determination of the Poisson ratio and sample slippage[2]. Here we present preliminary results of our observations. 1: B Feldman, J Martin, A Yacoby, "Broken-symmetry states and divergent resistance in suspended bilayer graphene", Nature Physics, doi:10.1038/nphys1406 2: C Metzger et al, "Biaxial strain in graphene adhered to shallow depressions", Accepted for publication in Nano Letters

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